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User's Manual for the Biodiversity and Threatened and Endangered Species Experts (BioTES) Tool

Version 1.0

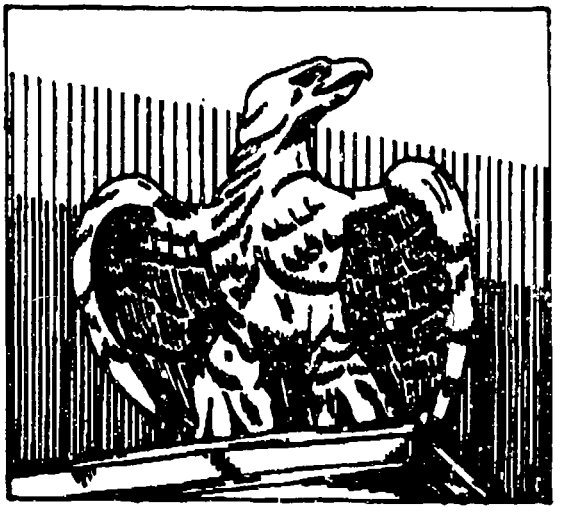
by
Georgia Sebesta and Alison Hill

The Biodiversity and Threatened and Endangered Species Experts (BioTES) version 1.0 helps installation and government personnel locate points of contact for experts in the areas of biodiversity and threatened and endangered species. BioTES presents names, contact information, areas of expertise, and interests of these experts.

BioTES 1.0 requires as a minimum, a 386 IBM-compatible 25-MHZ personal computer with a minimum of 2 MB of Random Access Memory (RAM), VGA capabilities, and 10 MB of hard drive spare.

The system must have DOS 3.0 or newer, and Windows 3.1. For the best performance, a 486SX 33 MHZ (or higher) with 8 MB RAM and SuperVGA capabilities are recommended.

This manual contains instructions on installing and using BioTES to search for experts, and on updating and adding information.



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Foreword

This study was conducted for the Legacy Program, under Military Interdepartmental Purchase Request (MIPR) No. E87920547, dated 17 September 1992, Work Unit #329; "Military Land Management Biodiversity Support Network." The technical monitors were Don Bandel and Phil Pierce, DAIM-ED-N.

The work was performed by the Natural Resource Assessment and Management Division (LL-N) of the Land Management Laboratory (LL), U.S. Army Construction Engineering Research Laboratories (USACERL). The USACERL principal investigator was Dr. Alison Hill. Special acknowledgment is due to Alan Anderson, Dr. Jan Briede, Karyn McDermaid, and Shelia Mochel for their technical contributions. Dr. David J. Tazik is Acting Chief, CECER-LL-N; and Dr. William D. Severinghaus is Operations Chief, CECER-LL. The USACERL technical editor was Gloria J. Wienke, Technical Resources.

COL James T. Scott is Commander, and Dr. Michael J. O'Connor is Director of USACERL.

The Legacy Resource Management program was established in 1991 by the U.S. Congress to provide Department of Defense (DoD) with an opportunity to enhance the management of stewardship resources on over 25 million acres of land under DoD jurisdiction.

Legacy allows DoD to determine how to better integrate the conservation of irreplaceable biological, cultural, and geophysical resources with the dynamic requirements of military missions. To achieve this goal, DoD gives high priority to investigating, protecting, and restoring, biological, cultural, and geophysical resources in a comprehensive, cost-effective manner, in partnership with Federal, State, and local agencies, and private groups.

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1 Introduction

Background

More than 400 threatened, endangered, and sensitive (TES) species are known or suspected to reside on Army lands. The Army is faced with the challenge of managing the land and answering many questions regarding TES species. Often, Army land managers may not have the information they need to make land-based decisions. A great deal of time is spent tracking down answers to these questions, often requiring numerous phone calls and hours of library searching. The U.S. Army Construction Engineering Research Laboratories (USACERL), in developing capabilities to enhance the military's ability to meet requirements of the Endangered Species Act (ESA), developed the BioTES program and the supporting database (Appendix A) as a component of the TES Species Automated Information Management System (TESSAIMS) (Sebesta, 1995). The BioTES program is intended to help fulfill the military's needs by providing a reference tool and networking instrument for managers with questions on biodiversity and TES species. BioTES can help get managers get answers more quickly by narrowing the information search and directing them to the right experts.

Biodiversity and Threatened and Endangered Species Experts (BioTES) is a stand-alone program that consists of: (1) a database listing experts within the areas of Biodiversity and TES species, and (2) a Graphic User Interface (GUI) that permits users to connect with the database. The program is a valuable reference tool, a networking instrument, and a foundation for interagency council for those with TES species-related questions. It is not intended to be the definitive source for all subject matter experts. Instead, it serves as a first look at subject matter experts and provides a searching framework to expand upon. Although BioTES was designed for military users, it has applicability to other governmental agencies and many non-governmental organizations.

Objective

The objective of this effort is to provide a reference tool and networking instrument for land managers with questions on managing sensitive areas and species. This

effort includes the following steps: assemble a list of experts from a cross section of professionals, develop a prototype application to provide easy access to the information, and generate a standard report to convey the information.

Approach

The main program, TESSAIMS (Sebesta 1995), of which BioTES is a component was developed in four distinct stages that overlapped in time. These four stages included development of the database and information needs, and development of three individual applications: BioTES, Species-Specific Biological Information (SSBI) (Sebesta and Hill, December 1996), and Installation-Specific Tracking Information (TRACKER) (Sebesta and Hill, DRAFT). Database development continued to change and improve throughout the entire TESSAIMS development process. BioTES is the first developed application. It was chosen as the first application due to the completeness and static nature of the information, as well as the ease of defining the capabilities and functionality.

The approach for BioTES development included three steps: (1) finding and compiling experts in the subject area, (2) assembling the experts database, and (3) developing an access tool for the database. The initial step was to use reference materials to find and compile a list of experts in the areas of Biodiversity and TES species. People on this list were sent a survey requesting more detailed information on their expertise and asking for permission to include them in the directory. Of approximately 1580 people who received the survey, 863 responded. Each expert filled in three areas of expertise. The second step was to create the database using the major keywords and topics from the survey. Once the database was partially populated, programming the front-end GUI began. The BioTES program and user's manual are the products of this effort.

Once the development stages were completed, internal and field testing validated both the information and the application. Internal testing comprised five stages: (1) choosing a group of knowledgeable experts in natural resources and application development, (2) distributing the application, (3) obtaining overall feedback, (4) analyzing feedback comments, and (5) modifying both the database and application as necessary. Internal testing on BioTES is completed. The release of the BioTES program, version 1.0 and this User's Manual are the end products of this effort.

Scope

The scope of BioTES is limited to the available information, database, and application. The information currently includes individuals or organizations from Federal and state government agencies, academia, and profit/nonprofit organizations. Information is current as of September 1993. In some instances, the listed experts may have changed positions or locations. In other cases, organizational points of contact may have changed.

BioTES accesses DBase files that have been converted from SQLBase files in the TES Species database. Users are not allowed to perform updates automatically in the database. Updates to this information will need to be done regularly and distributed to the interested organizations from a central location, such as an environmental support center. Further information on the update process is available in the section on Adding or Updating Information in Chapter 4. Additional information on the database is in Chapter 5. The application is developed to search on specific topic areas and associated keywords words from the original survey mechanism, as well as, to search on specific individuals or organizations. These two mechanisms are the only ways to obtain information from the database via the application.

Mode of Technology Transfer

The BioTES program will be sent to Major Commands and Army-level environmental managers. It is ready to be transitioned to the installations and a support organization. Support may be needed to help installation personnel install and use the program and to provide users with periodic updates of the database or newer versions of the program.

2 Using the Manual

Manual Specifics

The BioTES User's Manual is written with the assumption that you have a basic understanding of Microsoft Windows 3.1 and MS-DOS 3.0 or newer. If you need additional information on using Windows or MS-DOS, refer to the appropriate user's manual.

The next three chapters in this manual provide information on installing and using BioTES and a description of the system and its data requirements. Chapter 3 provides instructions for installing the program and preparing system changes that may be required. Specific instructions on various program options and ways to obtain the desired information from the database can be found in Chapter 4. Chapter 5 contains an explanation of the basic workings of TES Species database, BioTES-related database tables, the data elements, and the data collection process.

The manual can be used as a reference to help you find specific assistance with the various topics. Some instructions are repeated in different sections; others are cross-referenced to direct you to other sections with more detail on the topic. Throughout the manual, items are highlighted in a uniform manner.

Syntax is as follows:

<Bold>	Text in bold and surrounded by carats refers to menu selections, button controls, key strokes, or some action within the program.
Bold	Text in bold and starting with a capital letter refers to dialog boxes or windows.
Bold	Text in bold italics refers to output formats from the program.
BOLD	Text in bold and all capitals refers to file names, directories, or database elements, including table names and field or column names.

Terminology

In this manual, there are a few terms used repeatedly that refer to the same concept. The terms include:

Synonyms	Definition
Prototype, Application, Program, Front-End	Prototyped Application (Beta Version)
Exit, Close, Cancel	Leave dialog box, window, or program without any further actions
Data, Information	Specific information from the database

3 Installing BioTES

System Requirements

BioTES runs on an IBM-compatible personal computer (PC) under Windows 3.1. The minimum configuration is an IBM compatible 386 at 25 MHZ speed with at least 2 MB RAM. The minimum hard drive requirement for the program and its components is 10 MB. For ideal running capabilities, use a 486SX at 33 MHZ with 8 MB RAM, or better. The minimum monitor capabilities are VGA; use SuperVGA, or better, for best results.

Installation Process

Before installing the program, be sure to make a backup copy of the distribution disks as an added precaution in case of accidental data loss. Consider installing the backup disks, as opposed to the distribution disks. Once the backup is done, place the first disk into the correct floppy drive. Start Windows and select **<Run>** under **<File>** from the Windows Program Manager menu. Type in the appropriate drive and **INSTALIT** as in Figure 1.

Once the installation process begins, the program will ask you to enter the location from which you want to install the program and the drive you want to install it to. It is preferable to use the C: Drive (the default drive), if possible. The install program will install all the front-end program files and the database files on the

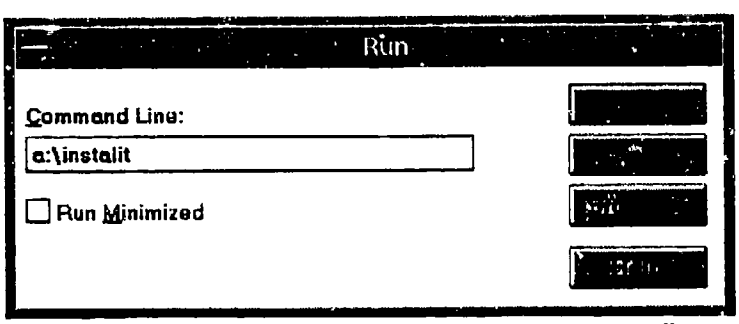

Figure 1. Using the Program Manager's <Run> to Install BioTES.

drive you chose. Four installation directories will be used and created, if necessary: **\BIOTES, \DBASE2, \WINDOWS,** and **\WINDOWS\SYSTEM**. The **BioTES** directory contains the necessary application files. The **DBASE2** directory contains all of the databases. The **WINDOWS** and **WINDOWS\SYSTEM** directories contain the necessary libraries and links for the database and the program to run under Windows. If a duplicate file is found, a dialog box pops up asking you to confirm replacing the file. This completes the installation program.

If you do not or cannot use the C: Drive you will need to modify several files once the install program is done. In the path statement of the **AUTOEXEC.BAT** or **BOOTPATH.BAT** file add the directory you have chosen for the program, e.g., **D:\BIOTES** and **D:\DBASE2**, and verify that **Windows** is in the path. You will also need to modify **ODBC.INI** file (Table 1), located in the **WINDOWS** directory. The line, DataDirectory=c:\dbase2, should be changed to the working directory for DBase, (i.e., DataDirectory=d:\dbase2).

Table 1. Example of ODBC.INI file.

```
[ODBC Data Sources]
QEDBF=dBase Files (*.dbf)

[QEDBF]
Driver=C:\WINDOWS\SYSTEM\simba.dll
FileType=dBase4
DataDirectory=c:\dbase2
SingleUser=True
```

4 Using BioTES

This chapter describes the use and manipulation of the BioTES program. It logically follows choices from the program's main menu and then proceeds with the order of the dialog boxes. Each of the main menu selections (Figure 2), **<File>**, **<Edit>**, **<Searching Criteria>**, **<Identification>**, and **<User Update>**, has a corresponding dialog box that requests information or a decision from you. Dialog boxes (Table 2) will be explained as the order requires. There are the two starting points to accessing information in BioTES, **<Criteria >** under the **<Searching Criteria>** menu and **<By Idcode>** or **<By Last Name>** under the **<Identification>** menu. **<Criteria>** brings up the **Multiple Criteria** dialog box. **<By Idcode>** and **<By Last Name>** menu selections pull up the **By Idcode/Last Name** dialog box. The **<User Update>** menu selections of **<New Person/Organization>**, **<Update Person/ Organization>**, and **<Data Definitions>** contain instructions for adding or updating information.

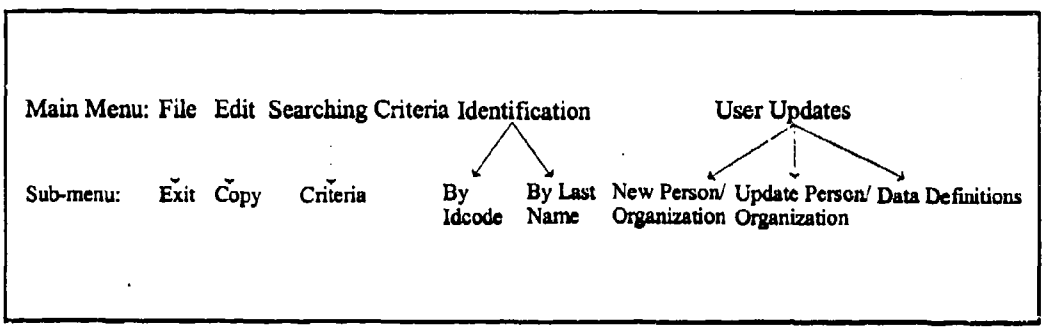

Figure 2. Menu setup for BioTES.

Table 2. Options available in each dialog box.

Dialog Box	Multiple Criteria	Quick Information	By Idcode or By Last Name	Full Information, Mailing Information, or Phone/Fax Information
Options (Buttons or Actions)	Quick Information Clear Close	Full Information Mailing Information Phone/Fax Information Back Close	Full Information Close	Back Close

File Menu - Exiting the Program

<Exit> closes and ends the program. The **<Exit>** option is located under the **<File>** menu option (Figure 3). Execute this option by clicking once on **<File>**, in the main menu, and then on **<Exit>**.

Edit Menu - Copying Information

The copy feature allows you to copy text from the BioTES program to a word processing program for future access. The **<Copy>** option is located under the **<Edit>** menu (Figure 4). You can copy all or part of the information from the ***Full Information***, ***Mailing Information***, and ***Phone/Fax Information*** screens by using the **<Copy>** command. Highlight the desired text by dragging the mouse across it and then click on the **<Copy>** button. Next access the desired word processor application and paste the information according to its instructions.

Searching Criteria - The Search Process

The **<Criteria>** option is located under the **<Searching Criteria>** menu (Figure 5). This option opens the **Multiple Criteria** dialog box (Figure 6) and starts the search process. To execute this option, select **<Criteria>** by clicking once on it with the mouse.

The **Multiple Criteria** dialog box (Figure 6) has seven main topic areas or selections that define the parameters for the search. These main topic areas are Organisms (e.g., amphibian, arachnid, bird), Employer, Geographic Region, Expertise, Work Experience, Discipline, and Management.

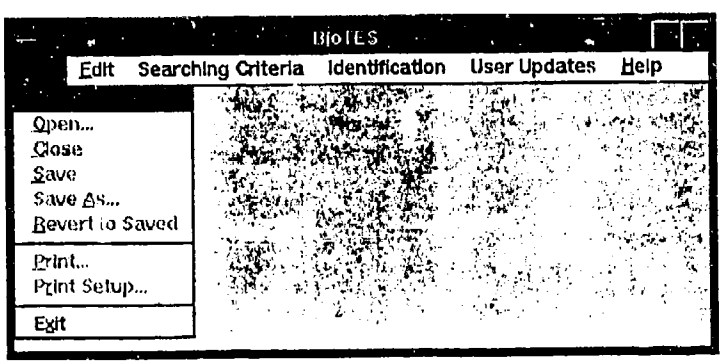

Figure 3. Menu for <Exit> command.

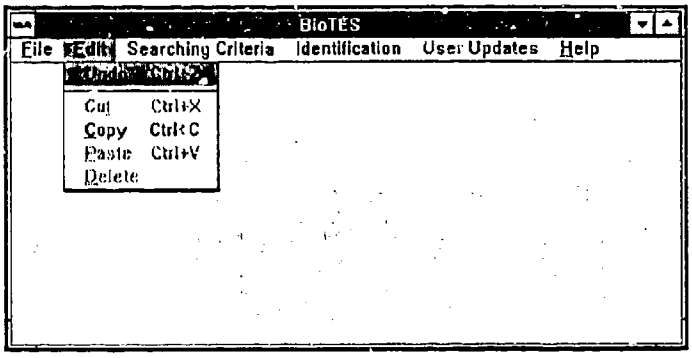

Figure 4. Menu for <Copy> command.

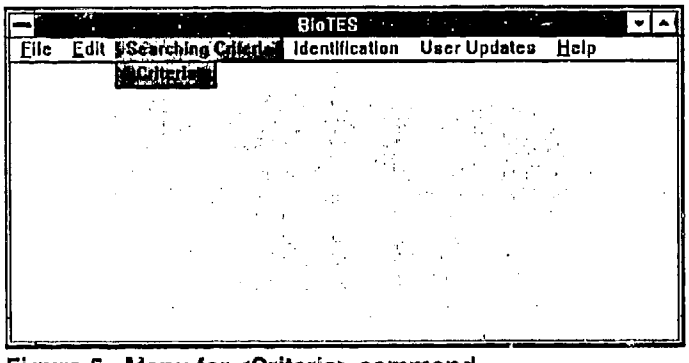

Figure 5. Menu for <Criteria> command.

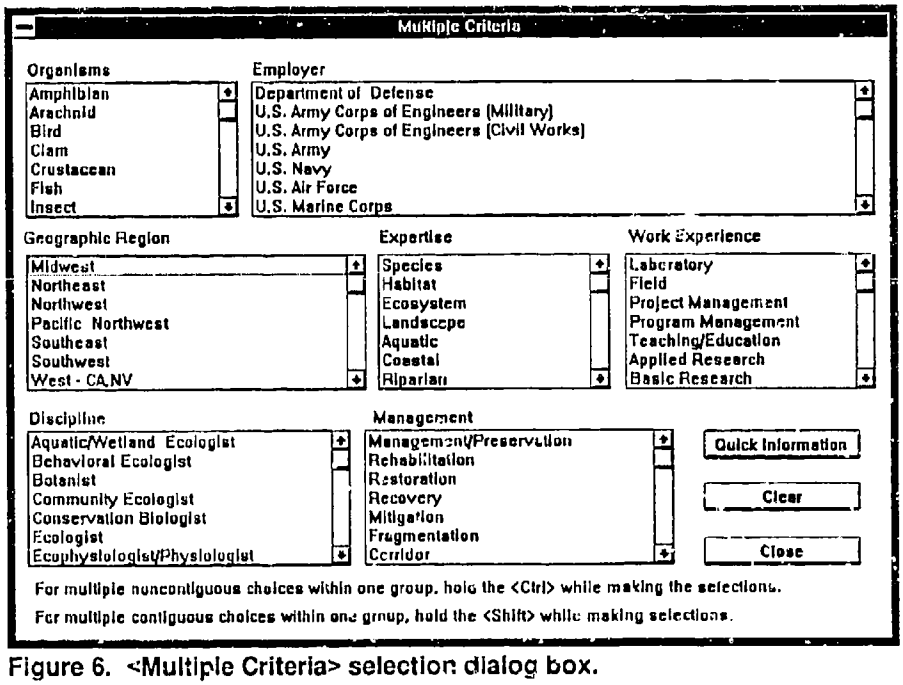

Figure 6. <Multiple Criteria> selection dialog box.

Any number of keyword selections can be chosen within each topic area and within multiple topic areas. However, five distinct keyword selections generally narrows the scope for an expedient search. Using more keywords in each search will produce a smaller, more manageable set of experts. Multiple noncontiguous selections within one topic area are done by holding the **<Ctrl>** key down while making the choices. Multiple contiguous selection within one topic area are made by holding the **<Shift>** key down while clicking on the starting choice of the list and then clicking on the last choice. If you make a mistake during the selection process, use the **<Clear>** button in the lower right corner of the dialog box to clear all of the selections made up to that point. To clear a single selection, hold the **<CTRL>** key down while clicking once on the undesired selection with the mouse. Once the selection is correct, proceed by pressing the **<Quick Information>** button located in the lower right corner. This button retrieves the names of all of the people that meet the selected criteria and provides a total count (Figure 7). The **<Close>** button, located at the lower right corner of the dialog box, will close the dialog box and not retain any of the values selected up to that point.

Retrieving the Information Quickly

The **Quick Expert Information** dialog box (Figure 7) gives you a quick glance at the results of the search. It contains a total count as well as a list of personal identification codes (**IDCODE**) and names of the qualified individuals/organizations.

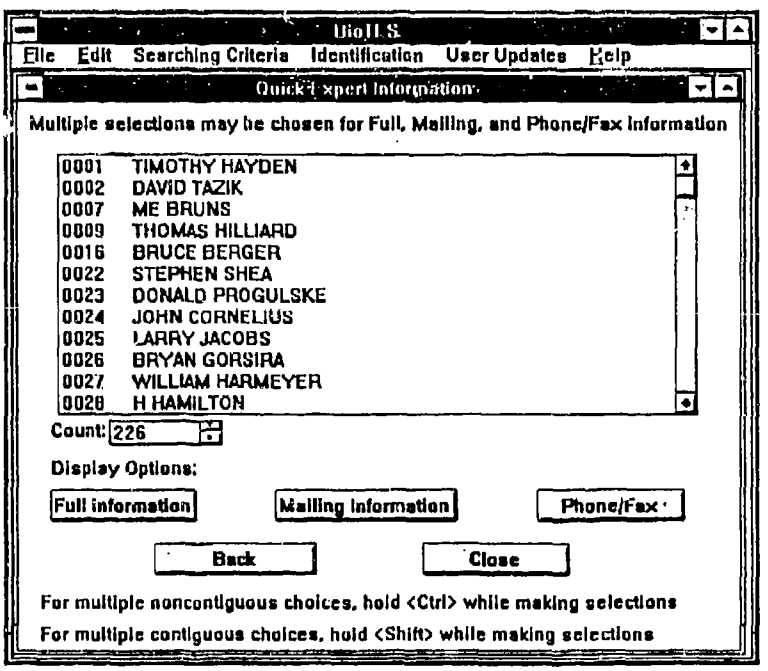

Figure 7. <Quick Expert Information> window layout.

IDCODE is explained in the Database Elements and Definitions section of Chapter 5. If you would like to continue and narrow the search, press the **<Back>** button, located at the bottom of the screen to return to the **Multiple Criteria** screen. Selections made in the last search will be retained so that additional selections will be appended to the existing selection. Refer back to the Searching Criteria - The Search Process section to revise the search selections. Generally, one more choice will narrow the range of the search as well as the number of experts. Proceed by pressing the **<Quick Information>** button again.

You can output the information in one of three output formats. This is discussed in more detail in the following section, titled Output Formats. The output buttons are located in the lower portion of the dialog box. You can select one or many names to output from the list box. To select multiple noncontiguous names, depress the **<Ctrl>** key while clicking on the desired names. For multiple contiguous selections, depress the **<Shift>** key while clicking on the first name and then on the last name in the desired list. The **<Close>** button, located on the lower right side of the window, will close the window and not retain any of the information up to that point.

Output Formats

The available output formats are **Full Information**, **Mailing Information**, and **Phone/Fax Information**. **Full Information** outputs all information available from the database on individuals/organizations. It includes mailing address, phone number, fax number, the areas of expertise, and a ranking of their areas of expertise. This option provides the most information about the expert. **Mailing Information** outputs the full mailing address for the selected names. It is useful for creating a mailing list to be stored in a word processor for later use. **Phone/Fax Information** provides the phone number and fax number, as well as the name, organization, and state of residence of the expert. This option is helpful for creating a personal phone list.

Full Information

The **Full Information** (Table 3) output format contains all available data from the database. This includes an **IDCODE**, name, position, organization, address, phone, fax, education, and three areas of expertise. Each of the primary areas consists of topic areas, with the associated keywords, including: Individual Level, State, Geographic Region, Community Type, Expertise, Management Experience, Work Experience, and Discipline. The specific data elements are explained in the Database Elements and Definitions section of Chapter 5. To go back to the previous

Table 3. Example of Full Information Output.

00XX
JONES, TOM R.
WILDLIFE ECOLOGIST
US ARMY CONSTRUCTION ENGINEERING RESEARCH LABORATORIES (ENR)
PO BOX 9005
CHAMPAIGN, IL 61826-9005
Phone: 217/XXX-XXXX xXXX Fax: 217/XXX-XXXX
Final Degree: PhD from U OF WI

Primary Area 1:
Individual Level: (BIR)PASSERIFORMES
State: New Mexico
Geographic Region: Southwest
Community Type: PINYON-JUNIPER
Expertise: Species, Habitat, Landscape, Terrestrial
Management Experience: Management/Preservation, Recovery, Invader/Pest
Work Experience: Field, Project Management, Applied Research, Basic Research, Inventory/Monitoring
Discipline: Conservation Biologist, Ecologist, Ornithologist

Primary Area 2:
Individual Level: (BIR)PASSERIFORMES
State: Missouri
Geographic Region: Midwest
Community Type: DECIDUOUS HARDWOOD FORESTS
Expertise: Species, Habitat, Landscape, Terrestrial
Management Experience: Management/Preservation, Fragmentation
Work Experience: Field, Project Management, Basic Research
Discipline: Community Ecologist, Ecologist, Wildlife Biologist

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Primary Area 3:
Individual Level: (BIR)PASSERIFORMES
State: Georgia
Geographic Region: Southeast
Community Type: LONG LEAF PINE
Expertise: Species, Habitat, Terrestrial
Management Experience: Management/Preservation, Recovery, Mitigation
Work Experience: Field, Applied Research, Basic Research
Discipline: Behavioral Ecologist, Ornithologist, Wildlife Biologist

screen to choose another output format or other experts from the **Quick Information** window, press the **<Back>** button located at the bottom of the screen. This information can also be copied into a word processor, using the copy procedure. Refer to **<Copy>** under the **<Edit>** section of this chapter. The **<Close>** button, located in the lower right corner of the window, will take you out of this window, not retaining any of the information currently chosen.

Mailing Information

The **Mailing Information** (Table 4) output format contains the **IDCODE**, name, and mailing address. Specific data elements are explained in the Database Elements and Definitions section of the Chapter 5. To choose other output formats or individuals/organizations from the **Quick Information** window, press the **<Back>** button located at the bottom of the screen. To copy the information to a word processor, refer to **<Copy>** under the **<Edit>** section of this chapter. The **<Close>** button located in the lower right corner of the window will take you out of this window, not retaining any of the information currently chosen.

Phone/Fax Information

The **Phone/Fax Information** (Table 5) output format provides the **IDCODE**, state, name, position, organization, and phone and fax numbers. The specific data elements are explained in the Database Elements and Definitions section of Chapter 5. To view other output formats or individuals/organizations from the **Quick Information** window, press the **<Back>** button located at the bottom of the screen.

Table 4. Example of Mailing Information Output.

00XX
MR BOB R SMITH
NATURAL RESOURCES DEPARTMENT, CORNELL UNIVERISTY
ITHICA, NY 14853

000X
DR DAVE STONE
DNR, DIVISION OF NATURE PRESERVES
402 W WASHINGTON, ROOM XXX
INDIANAPOLIS, IN 46204

Table 5. Example of Phone/Fax Information.

00XX State:NY
MR BOB R SMITH
NATURAL RESOURCES DEPARTMENT, CORNELL UNIVERISTY
Phone: XXX/XXX-XXXX
Fax: XXX/XXX-XXXX

000X State: IN
DR DAVE STONE
DNR, DIVISION OF NATURE PRESERVES
Phone: XXX/XXX-XXXX
Fax: XXX/XXX-XXXX

To copy the information to a word processor, refer to **<Copy>** under the **<Edit>** section of this chapter. The **<Close>** button, located in the lower right corner of the window, will take you out of this window, not retaining any of the information currently chosen.

Other Methods of Accessing Information

By Idcode

Once the various **IDCODE**s are determined, it is easy to access the full information directly. **IDCODE** is defined in the Data section of Chapter 5. The **<By Idcode>** button, under **<Identification>** (Figure 8) in the main menu, calls up the entire list of **IDCODE**s from the database. If you know the **IDCODE**, start by typing it in the drop-down box (Figure 9) and click on the down arrow located at the right hand side of the drop-down box. This will bring you to the nearest **IDCODE**. Remember that **IDCODE** is a four-digit number starting with zeros; these zeros must be entered to match with entries in the database. Press the **<Full Information>** button located on the right side of the dialog box to proceed to the ***Full Information*** output format. The **<Close>** button, on the right hand side, will exit you from the dialog box, not retaining any of the information that may have been selected.

By Last Name

Similar to **<By Idcode>**, a search can be performed on a last name. The **<By Last Name>** (Figure 8) option is under **<Identification>** in the main menu. Using **<By Last Name>** allows you to enter the last name into the field of the drop-down box (Figure 10). By pressing the down arrow on the right side of the drop-down box, the

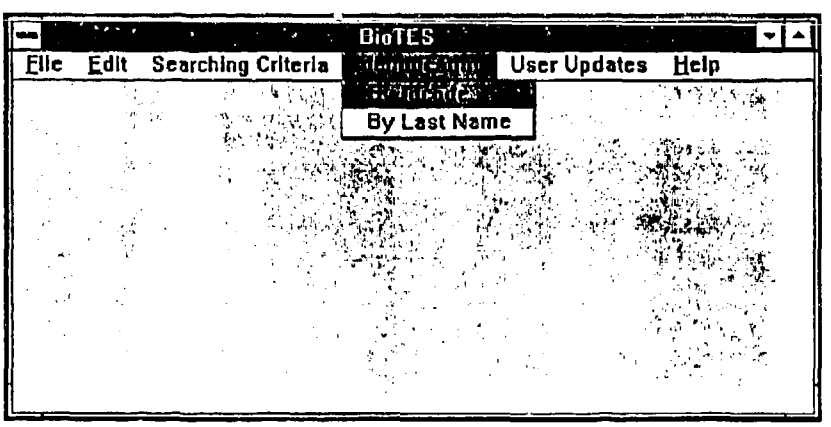


Figure 8. Menu for Identification <by Idcode> or <by Last Name>.

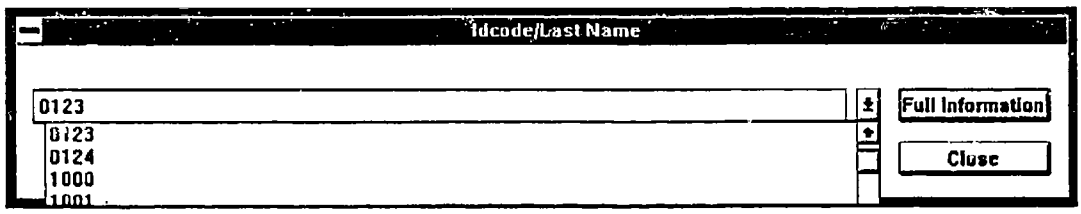


Figure 9. <By Idcode> dialog box.

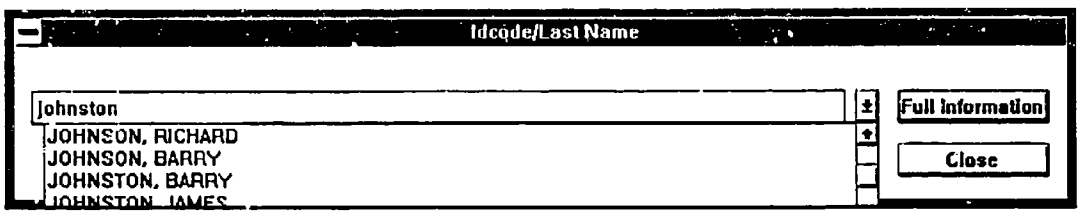


Figure 10. <By Last Name> dialog box.

first, or nearest, occurrence of that name is brought up. The database is case sensitive when the search is performed, so you need to select the desired name from the drop-down list to provide an exact match in upper case. Press the **<Full Information>** button located on the right side of the dialog box to proceed to ***Full Information*** output format. The **<Close>** button will exit you from the dialog box, not retaining any of the selected information.

Adding or Updating Information

New Person/Organization

You can find instructions in the **<New Person/Organization>** (Figure 11) option under **<User Updates>** in the main menu for adding a new person or organization

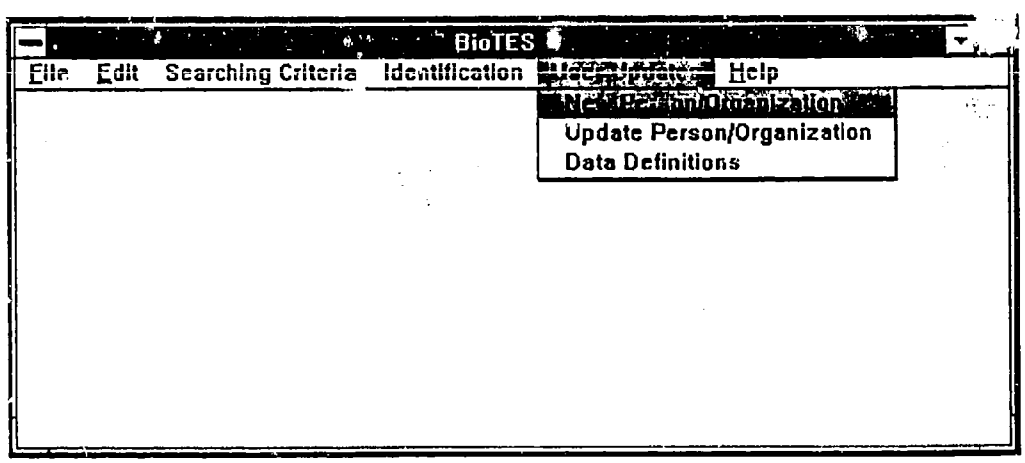


Figure 11. Menu for <User Update> selections.

to the database. New information will need to be submitted to a support organization managing this application and database. The **New Person/Organization** (Figure 12) dialog box can be dismissed using the **<Close>** button located at the lower right corner of the dialog box.

Update Person/Organization

To view an explanation of updating information, choose **<Update Person/ Organization>** (Figure 11) under **<User Updates>** in the main menu. This selection brings up the **Update Person/Organization** (Figure 13) dialog box. You can then select **<By Last Name>** (Figure 8) under **<Identification>** in the main menu, to view the ***Full Information*** output format. You can select the appropriate name from the drop-down box and press the **<Full Information>** button for the current information. If there are changes to be made, copy all the information into a text editor and make the corrections. Save the file as an ASCII text document and mail to the address given in **<Update Person/ Organization>**. The **Update Person/Organization** (Figure 13) dialog box can be dismissed using the **<Close>** button located at the lower right corner of the dialog box.

Data Elements and Data Definitions

A series of topic areas and associated keywords were used in the initial classification of the data. These keywords can be found under **<Data Definitions>** (Figure 11) under **<User Update>** in the main menu. This is strictly for your information. This information may be useful when updating an expert description. The keywords were included when the initial data request (Appendix B) was mailed out, and used

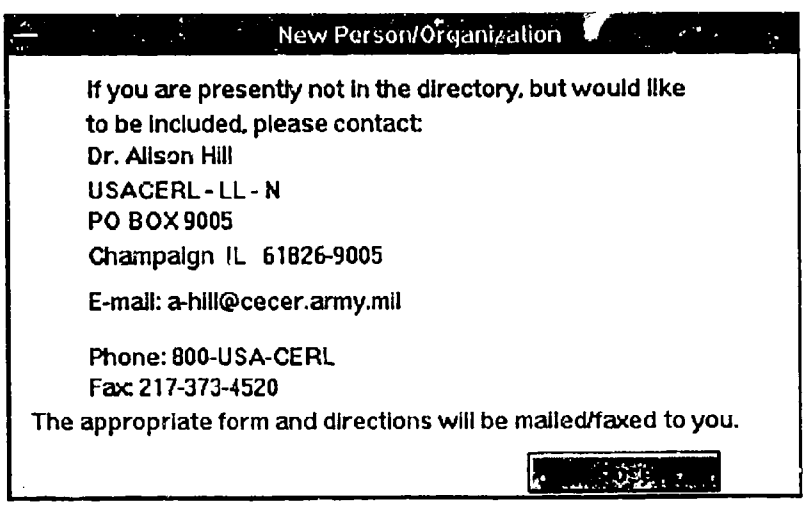


Figure 12. <New Person/Organization> dialog box.

to narrow the scope of the search. The **Data Definitions** (Figure 14) dialog box can be dismissed by clicking on the **<Close>** button in the lower right corner of the dialog box.

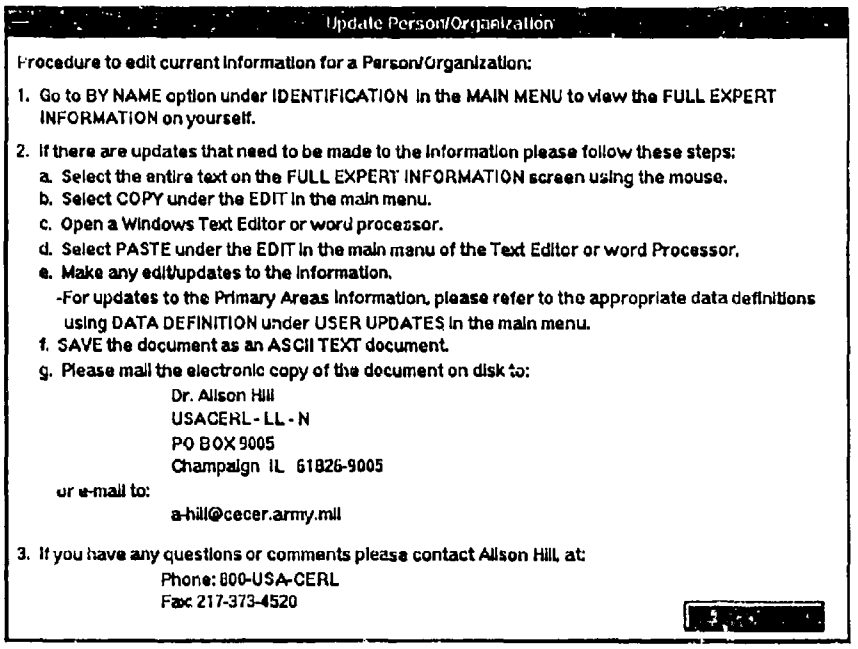


Figure 13. <Update Person/Organization> dialog box.

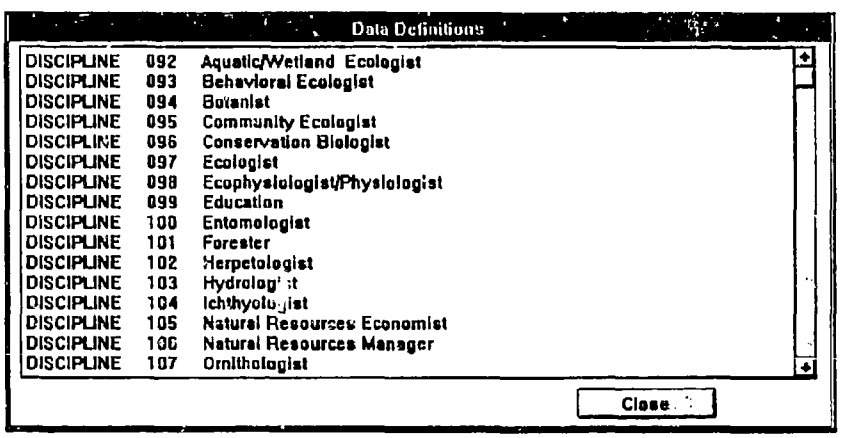


Figure 14. <Data Definitions> dialog box.

5 Data and Database

Data Source

The BioTES portion of the TES Species database provides a centralized listing of individual and organizational expertise with specialties in sensitive resources and biological diversity. It is the result of a nationwide search for researchers, land managers, consultants, and administrators from the state and Federal government, academia, conservation organizations, and private enterprise. Project staff conducted a search on biodiversity, threatened species, and endangered species literature after 1988, to collect the initial reference names and affiliations. They also consulted printed directories (i.e., U.S. Heritage Programs, The Nature Conservancy Directory, and the 1993 Conservation Directory of the National Wildlife Federation), specialized publications, and conference listings to gather other potential reference names. Staff sent out a data request form (Appendix B), to 1580 reference names in June 1993. This mailing yielded 863 responses, or a 54 percent response rate, in a 3-month time period. Information on respondents that returned the data request form was entered into a database, with the understanding that the information was voluntary and would be distributed for public use.

Data Entry and Validation

During the data entry process a series of validation steps were performed. The first step involved entering the date the survey was received by the staff and the initials of the staff member into the database, and quickly reading through of the survey, checking for completeness or any major errors. Next, the information was entered; the initials of the individual staff member and date were also entered. Lastly, the information was validated by a different staff member, recording initials and date. If there was a disagreement on individual surveys, internal discussions took place in an attempt to resolve the issue. In the case of no resolution, the individual or organization that responded to the survey was contacted. The most prevalent data entry problem was deciphering poor handwriting. Other problems included typing errors and lack of initial data entry standards. To date, the information has been validated and is considered accurate as of September 1993.

Data and Database Limitations

Some cases of data limitations affected the database and the application. Information collected from the survey had some limitations and required some manipulations. Most limitations could be worked around in the initial development stages of the data entry and database. For example, the name of individuals was divided into four distinct fields in the database tables. These four fields included title (e.g., Mr, Mrs, Captain), first name, middle name, and last name. This separation allowed for last name searches and easy access to the information. Other limitations for the application, due to the data, could not be dealt with. One comment, received from internal testing process, was that the application could not search on distinct genus or species as a part of expertise. The information gathered from the survey did not make this option available. Respondents to the survey in many cases did not provide this information.

Database Structure

The BioTES program tables (Figure 15) are a small portion of the entire TES Species database (Appendix A). The overall database consists of three distinct sets of information with established links. Each set of information supports one of the TESSAIMS applications. Most of the table names start with a unique letter. For

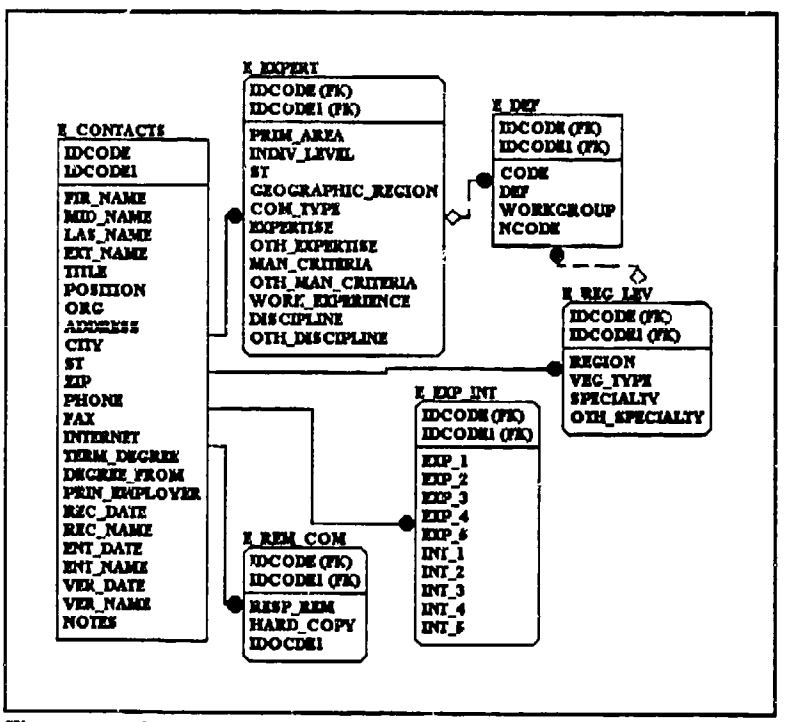


Figure 15. Database structure for BioTES tables.

example, E_ labels tables support BioTES, S_ labels are species-specific information tables (Sebesta and Hill, December 1996), and T_ labels are installation-specific information tables (Sebesta and Hill, DRAFT). Individual tables and fields are defined in further detail in the Database Tables and Column Names section of this chapter. The TES Species database is a relational database, meaning that it is composed of a series of data tables linked or related by primary keys. Primary keys are required data elements used to uniquely identify each row in the tables. In this case, **IDCODE** and **IDCODE1** are unique reference codes for each expert. Examples of these **IDCODE**s are in the Database Tables and Column Names of this chapter.

Five tables present the bulk of the information available in the various output formats, explained in Using BioTES, Chapter 2. **E_CONTACTS** is the entry point for all new information. If the reference code for a person does not exists in this table, it cannot exist in the remainder of the tables. **E_EXPERT, E_REG_LEV, E_EXP_INT,** and **E_REM_COM** contains specific information on each expert. **E_EXPERT** contains areas of expertise in several categories, using predefined choices. **E_REG_LEVEL** contains specified regional, community, and vegetation type specialties and expertise. **E_EXP_INT** contains the five top areas of expertise and interest. **E_REM_COMM** contains remarks, comments, and any information from the individual experts. The format of this information is explained in the Database Tables and Column Names section in this chapter. **E_DEF** is a definition table for the codes used in the other tables for this portion of the database.

Database Tables and Column Names

The following is a list of tables (in bold and capital letters) and the list of elements (in capital letters) within each. These tables and elements correspond to Figure 15. The information on the right side is the definitions for these tables or elements. **IDCODE1**, a four digit numeric code, is the primary key for all of the listed tables. This code is assigned using the employer as the general designator. Those with a code 0001-0999 are DoD employees; 1000-1999 are Federal employees, 2000-2999 are state employees, 3000-3999 are non-profit and professional organization employees, 4000-4999 are university or college employees, and 5000-5999 are affiliated with independent for-profit organizations. **IDCODE1** uses zeros as place holders, when necessary to fill out the four digits, for easier access and searches on the individuals or organizations.

E_REM_COMM	Remarks, comments, and any information from the individuals

IDCODE	Code for the individuals
RESP_REM	Any remarks or comments by the individual
HARD_COPY	Any paper copies of information sent in by individual (i.e., Resume)
IDCODE1	Four digit code for individuals

E_REG_LEVEL Regional, community and vegetation type specialties and expertise

IDCODE	Code for the individuals
REGION	Region of the US in one word
VEG_TYPE	Vegetation type or Community type specialty in one word
SPECIALTY	Choice of 11 specialties (i.e., Terrestrial, Aquatic, Species,...)
OTH_SPECIALTY	Secondary specialty choice
IDCODE1	Four digit code for individuals

E_EXPERT Area of expertise in several categories, using predefined choices

IDCODE	Code for the individuals
PRIM_AREA	Primary Area of expertise (1, 2, or 3)
INDIV_LEVEL	Individual level of expertise (species, family, category,...)
ST	Primary state of expertise
GEOGRAPHIC_REGION	Primary geographic region of expertise, worldwide
COM_TYPE	Community type expertise
EXPERTISE	Generic areas of expertise
OTH_EXPERTISE	Other areas of expertise
MAN_CRITERIA	Areas of expertise in management
OTH_MAN_CRITERIA	Other areas of expertise in management
WORK_EXPERIENCE	Areas of expertise in work experience
DISCIPLINE	Areas of discipline and training
OTH_DISCIPLINE	Other areas of discipline and training
IDCODE1	Four digit code for individuals

E_CONTACT Contact information for the individual

IDCODE	Code for the individuals
FIR_NAME	First name
MID_NAME	Middle name or initial
LAS_NAME	Last name

EXT_NAME	Extended name
TITLE	Title
POSITION	Position
ORG	Organization associated with
ADDRESS	Mailing work address
CITY	City
ST	State
ZIP	Zip code
PHONE	Work phone
FAX	Work fax
INTERNET	Internet address for electronic mail
TERM_DEGREE	Last degree
DEGREE_FROM	Degree earned at
PRIN_EMPLOYER	Principle employer
REC_DATE	Date information received
REC_NAME	Name of person receiving information
ENT_DATE	Date information entered
IDCODE1	Four digit code for individuals
ENT_NAME	Name of person entering information
VER_DATE	Date information verified
VER_NAME	Name of person verifying information
NOTES	Notes for database administration

E_EXP_INT	List of top 5 areas of expertise and interest
IDCODE1	Four digit code for individuals
IDCODE	Code for the individuals
EXP_1	Expertise 1
EXP_2	Expertise 2
EXP_3	Expertise 3
EXP_4	Expertise 4
EXP_5	Expertise 5
INT_1	Interest 1
INT_2	Interest 2
INT_3	Interest 3
INT_4	Interest 4
INT_5	Interest 5

E_DEF	Definitions for codes used in data entry for expertise
CODE	Code for elements
NCODE	3 digit integer for code
DEF	Definitions for code

WORKGROUP	Table or heading the code is valid for

Keyword and Data Definitions

The following is a list of codes in the database and their definitions. The use of these codes makes the database easier to manage and manipulate. The definitions in the right hand column are what you see if you access the information directly. Direct access, without using the program is not recommended. These codes are used in several information columns, i.e., **GEOGRAPHIC_REGION, COM_TYPE, EXPERTISE**, etc., within the database. Multiple codes, separated by a comma, may be used in each column to adequately describe individual expertise.

EMPLOYER

A0	DEPARTMENT OF DEFENSE
A1	U.S. ARMY CORPS OF ENGINEERS (MILITARY)
A2	U.S. ARMY CORPS OF ENGINEERS (CIVIL WORKS)
A3	U.S. ARMY
A4	U.S NAVY
A5	U.S. AIR FORCE
A6	U.S. MARINE CORPS
A7	NATIONAL GUARD BUREAU
A8	OTHER
B0	FEDERAL GOVERNMENT
B1	US FISH AND WILDLIFE
E2	US FOREST SERVICE
B3	NATIONAL PARK SERVICE
B4	ENVIRONMENTAL PROTECTION AGENCY
B5	BUREAU OF LAND MANAGEMENT
B6	OTHER
C0	STATE AND TRIBAL GOVERNMENT
C1	STATE HERITAGE PROGRAM
C2	DEPARTMENT OF NATURAL RESOURCES AND/OR CONSERVATION
C3	OTHER
D0	NON-PROFIT ORGANIZATIONS
D1	THE NATURE CONSERVANCY
D1	OTHER
E0	UNIVERSITIES/COLLEGES
F0	FOR-PROFIT ORGANIZATIONS
G0	OTHER

STATES

AL	(1)	ALABAMA
AK	(2)	ALASKA
AZ	(3)	ARIZONA
AR	(4)	ARKANSAS
CA	(5)	CALIFORNIA
CO	(6)	COLORADO
CT	(7)	CONNECTICUT
DE	(8)	DELAWARE
FL	(9)	FLORIDA
GA	(10)	GEORGIA
HI	(11)	HAWAII
ID	(12)	IDAHO
IL	(13)	ILLINOIS
IN	(14)	INDIANA
IA	(15)	IOWA
KS	(16)	KANSAS
KY	(17)	KENTUCKY
LA	(18)	LOUISIANA
ME	(19)	MAINE
MD	(20)	MARYLAND
MA	(21)	MASSACHUSETTS
MI	(22)	MICHIGAN
MN	(23)	MINNESOTA
MS	(24)	MISSISSIPPI
MO	(25)	MISSOURI
MT	(26)	MONTANA
NE	(27)	NEBRASKA

GEOGRAPHIC REGION

(54)	MIDWEST
(55)	NORTH EAST
(56)	NORTHWEST
(57)	PACIFIC NORTHWEST
(58)	SOUTHEAST
(59)	SOUTHWEST
(119)	CANADA
(120)	WEST - CA, NV
(121)	UNITED STATES
(122)	TROPICS
(123)	PACIFIC - GU, HI (I.E., ISLANDS IN PACIFIC)
(124)	ROCKY MOUNTAINS
(126)	CENTRAL AMERICA
(127)	CENTRAL EUROPE (E.G., GERMANY)
(138)	AUSTRALIA
(139)	NORTH AMERICA
(140)	WORLDWIDE
(141)	AFRICA

EXPERTISE

(60)	SPECIES
(61)	HABITAT
(62)	ECOSYSTEM
(63)	LANDSCAPE
(64)	AQUATIC
(65)	COASTAL

NV	(28)	NEVADA
NH	(29)	NEW HAMPSHIRE
NJ	(30)	NEW JERSEY
NM	(31)	NEW MEXICO
NY	(32)	NEW YORK
NC	(33)	NORTH CAROLINA
ND	(34)	NORTH DAKOTA
OH	(35)	OHIO
OK	(36)	OKLAHOMA
OR	(37)	OREGON
PA	(38)	PENNSYLVANIA
RI	(39)	RHODE ISLAND
SC	(40)	SOUTH CAROLINA
SD	(41)	SOUTH DAKOTA
TN	(42)	TENNESSEE
TX	(43)	TEXAS
UT	(44)	UTAH
VT	(45)	VERMONT
VA	(46)	VIRGINIA
WA	(47)	WASHINGTON
WV	(48)	WEST VIRGINIA
WI	(49)	WISCONSIN
WY	(50)	WYOMING
PR	(51)	PUERTO RICO & VIRGIN ISLANDS
	(52)	WASHINGTON D.C.
GU	(53)	GUAM
	(119)	CANADA
	(121)	ALL STATES
	(125)	PANAMA
	(126)	CENTRAL AMERICA
	(127)	CENTRAL EUROPE
	(138)	AUSTRALIA
	(141)	AFRICA

DISCIPLINE

(92) AQUATIC/WETLAND ECOLOGIST
(93) BEHAVIORAL ECOLOGIST
(94) BOTANIST
(95) COMMUNITY ECOLOGIST
(96) CONSERVATION BIOLOGIST
(97) ECOLOGIST
(98) ECOPHYSIOLOGIST/PHYSIOLOGIST
(99) EDUCATION
(100) ENTOMOLOGIST
(101) FORESTER
(102) HERPETOLOGIST
(103) HYDROLOGIST
(104) ICHTHYOLOGIST
(105) NATURAL RESOURCES ECONOMIST
(106) NATURAL RESOURCES MANAGER

	(66)	RIPARIAN
	(67)	TERRESTRIAL
	(68)	COMMUNITY
	(69)	OTHER

MANAGEMENT

(70)	MANAGEMENT/PRESERVATION
(71)	REHABILITATION
(72)	RESTORATION
(73)	RECOVERY
(74)	MITIGATION
(75)	FRAGMENTATION
(76)	CORRIDOR
(77)	INVADER/PEST
(78)	OTHER

WORK EXPERIENCE

(79)	LABORATORY
(80)	FIELD
(81)	PROJECT MANAGEMENT
(82)	PROGRAM MANAGEMENT
(83)	TEACHING/EDUCATION
(84)	APPLIED RESEARCH
(85)	BASIC RESEARCH
(86)	THEORETICAL RESEARCH
(87)	MODELING
(88)	INVENTORY/MONITORING
(89)	LCTA/ITAM
(90)	POLICY
(91)	LEGAL

ABBREVIATIONS

AFB	AIR FORCE BASE
AFR	AIR FORCE RANGE
ATTN	ATTENTION
AVE	AVENUE
BLVD	BOULEVARD
C	COLLEGE
CDR	COMMANDER
CT	COURT
ST	STREET
DR	DRIVE
E	EAST
GIS	GEOGRAPHIC INFORMATION SYSTEMS
HQ	HEADQUARTERS
INC	INCORPORATED

(107) ORNITHOLOGIST
AREA(108) PEST MANAGER/WEED SCIENTIST
(109) RANGE MANAGER/SCIENTIST
(110) REMOTE SENSING/GIS
(111) REPRODUCTIVE BIOLOGIST
(112) RESTORATION ECOLOGIST
(113) SOIL SCIENTIST
(114) STATISTICAL ECOLOGIST
(115) TAXONOMIST
(116) WILDLIFE BIOLOGIST
(117) ZOOLOGIST
(118) OTHER
(128) FISHERIES BIOLOGIST
(129) PARASITOLOGIST
(130) BIOGEOGRAPHER
(131) MAMMALOGIST
(132) ARACHNOLOGIST
(133) ATTORNEY/LAWYER
(134) ARCHAEOLOGIST
(135) GENETICIST
(136) MALACOLOGIST
(137) PATHOLOGIST
(142) POPULATION GENETISIST
(143) GEOMORPHOLOGIST
(144) GEOGRAPHER
(145) GAP ANALYSIS
(146) FIRE ECOLOGIST
(147) ECOLOGICAL ECONOMIST
(148) ECOLOGICAL MODELER
(149) POPULATION ECOLOGIST
(150) POLICY
(151) PLANNER

ORGANISMS

(AMP)	AMPHIBIAN
(ARA)	ARACHNID
(BIR)	BIRD
(CLA)	CLAM
(CRU)	CRUSTACEAN
(FIS)	FISH
(INS)	INSECT
(MAM)	MAMMAL
(PLA)	PLANT
(REP)	REPTILE
(SNA)	SNAIL

ITAM	INTEGRATED TRAINING MANAGEMENT
LCTA	LAND CONDITION TREND ANALYSIS
LN	LANE
N	NORTH
NE	NORTHEAST
NW	NORTHWEST
PO	POST OFFICE
PL	PLACE
RD	ROAD
S	SOUTH
SE	SOUTHEAST
T&E	THREATENEDANDENDANGERED
SW	SOUTHWEST
W	WEST
U	UNIVERSITY
US	UNITED STATES

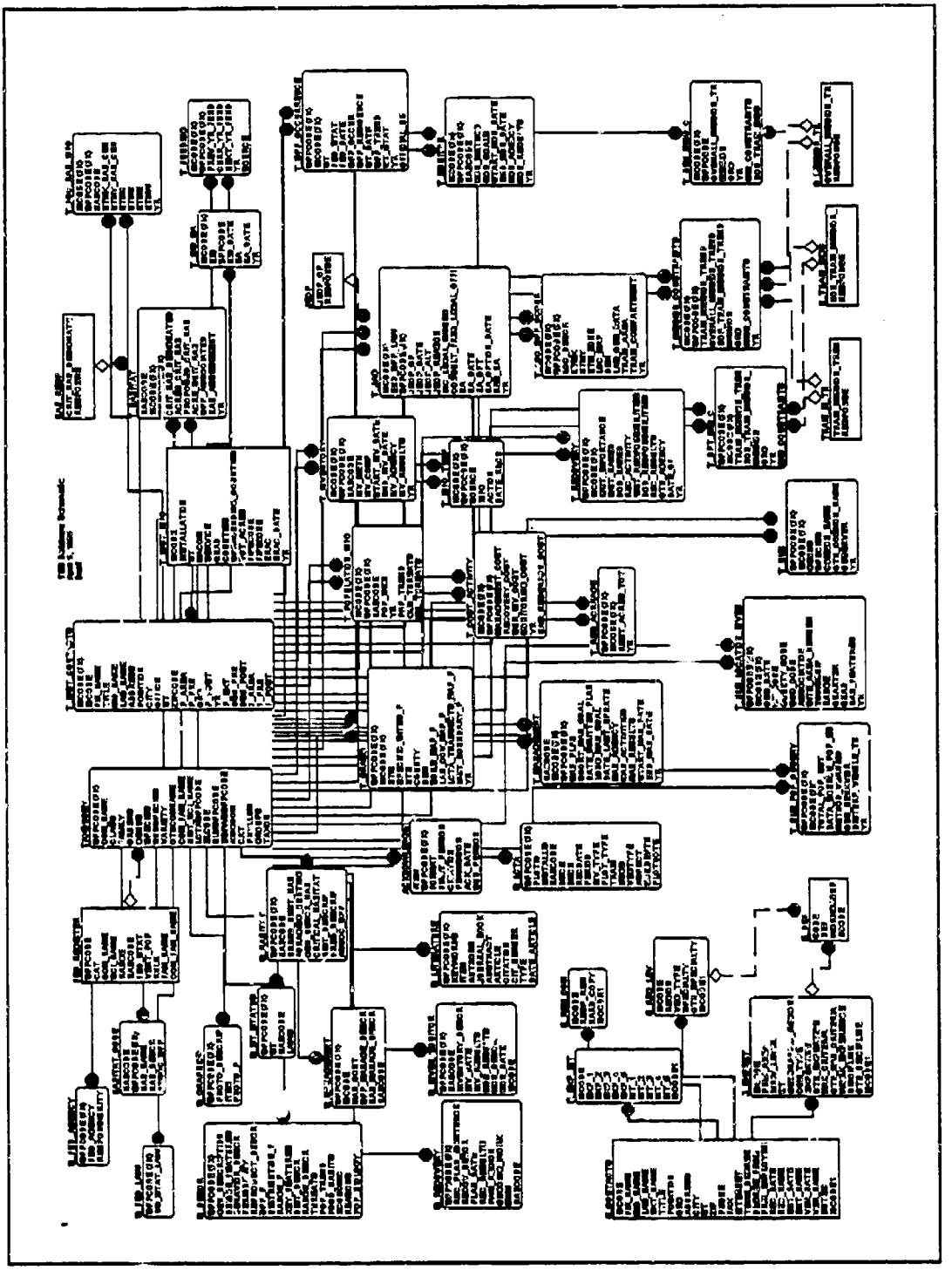
References

Sebesta, G, "Overview of Development of the Threatened, Endangered, and Sensitive (TES) Species Automated Information Management System (TESSAIMS), Department of Natural Resources and Environmental Sciences (University of Illinois, Champaign, IL, 1995).

Sebesta, G., and A. Hill, *User's Manual for Species-Specific Biological Information (SSBI) Tool Version 1.0*, ADP Report 97/20 (U.S. Army Construction Engineering Research Laboratories [USACERL], December 1996).

Sebesta, G., and A. Hill, *User's Manual for Installation-Specific Tracking Information (TRACKER) Tool Version 1.0*, Draft ADP Report (USACERL, DRAFT).

Appendix A: TES Automated Information Management System Database Schematic



Appendix B: Biodiversity and Threatened and Endangered Species Experts Data Request Form

ID#:_____ Input date:_____

Name:_____

Title:_____

Position:_____

Institution/Organization:_____

Address:_____

_____

Phone:(____)____-_____ Fax:(____)____-_____ Internet Address:_____

Terminal Degree:_____ from:_____

What best describes your principal employer? Please check one of the following major categories and one of the sub-categories if applicable:

_____A. Department of Defense
_____ 1. U.S. Army Corps of Engineers (Military)
_____ 2. U.S. Army Corps of Engineers (Civil Works)
_____ 3. U.S. Army
_____ 4. U.S. Navy
_____ 5. U.S. Air Force
_____ 6. U.S. Marine Corps
_____ 7. National Guard Bureau
_____ 8. Other (_____)
_____B. Federal Government
_____ 1. US Fish and Wildlife
_____ 2. US Forest Service
_____ 3. National Park Service
_____ 4. US Environmental Protection Agency
_____ 5. Bureau of Land Management
_____ 6. Other (_____)
_____C. State and Tribal Government
_____ 1. State Heritage Program
_____ 2. Department of Natural Resources and/or Conservation
_____ 3. Other (_____)
_____D. Non-Profit Organizations
_____ 1. Nature Conservancy
_____ 2. Other (_____)
_____E. Universities/Colleges
_____F. For-Profit Organizations
_____G. Other (_____)

In the broadest sense, please summarize and prioritize your expertise and interests in 5 keywords or less:

EXPERTISE	INTEREST
1._____	1._____
2._____	2._____
3._____	3._____
4._____	4._____
5._____	5._____

What best describes your regional and level of expertise?

1. REGION (please circle): NE / SE / NW / SW / PNW
2. ECOLOGICAL ZONE / VEGETATION TYPE / COMMUNITY TYPE:

_____

3. TYPE OF SPECIALTY (circle as many as applicable):
   Species / Community / Habitat / Landscape / Ecosystem
   Aquatic / Riparian / Coastal / Terrestrial / Other

To properly exhibit your multifarious expertise please fill out this table by marking or filling out the appropriate boxes in the three primary areas.

Expertise	AREA OF EXPERTISE				
	EXAMPLE		**Primary Area 1**	**Primary Area 2**	**Primary Area 3**
INDIVIDUAL LEVEL: please list either species, genus, family, etc. (scientific name please).					
Plants					
Mammals					
Clams					
Snails					
Fish					
Birds	**Picoides borealis**				
Reptiles					
Arachnids					
Insects					
Crustacean					
Amphibians					
GEOGRAPHIC EXPERTISE: use one state, geographic region, community type per cell only.					
State	**AL**				
Geographic region (NW/NE/PNW/SE/SW)	**SE**				
Community type	**Longleaf Pine**				
Please check your **EXPERTISE** level.					
Species	**X**				
Habitat	**X**				
Ecosystem					
Landscape					
Aquatic					
Coastal					
Riparian					
Terrestrial	**X**				
Other					
Please check the appropriate **MANAGEMENT CRITERIA.**					
Management/Preservation	**X**				
Rehabilitation					
Restoration					
Recovery					
Mitigation					
Fragmentation					
Corridor					
Invader/Pest					
Other					

Others/Remarks:

Expertise	AREA OF EXPERTISE				
	EXAMPLE		Primary Area 1	Primary Area 2	Primary Area 3
Please Check the appropriate WORK EXPERIENCE boxes.					
Laboratory exp.					
Field exp.	X				
Project manage. exp.	X				
Program manage. exp.					
Teaching exp.					
Applied research exp.	X				
Basic research exp.					
Theoretic. research exp.					
Modeling					
Inventory/monitoring					
LCTA/ITAM					
Policy					
Legal					
Please Check appropriate DISCIPLINE in this work.					
Aquatic/wetland ecologist					
Behavioral ecologist					
Botanist					
Community ecologist					
Conservation biologist					
Ecophysiologist/Physiol.					
Ecologist	X				
Education					
Entomologist					
Forester					
Herpetologist					
Hydrologist					
Ichthyologist					
Nat. resources economist					
Nat. resources manage.					
Ornithologist	X				
Pest manager/weed sci.					
Range scientist					
Remote sensing/GIS					
Reproductive biologist	X				
Restoration ecologist					
Soil scientist					
Statistical Ecologist					
Taxonomist					
Wildlife biologist					
Zoologist					
Other (specify)					

Others/Remarks:

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